

PAST twenty-five years witnessed great changes in the popular demand for the manufactured products of tobacco. These changes have necessarily been reflected in the producing areas, requiring the alteration of certain cultural practices, and reducing the production of fire-cured, dark air-cured, and cigar tobaccos, while greatly expanding the production of the flue-cured and burley types.

Changes in consumption toward the lighter tobaccos have in recent years brought about serious economic crises, made more difficult, especially in the export field, by the competition from the steadily increasing production of tobacco in foreign countries, by trade barriers and military operations. Recurring surpluses have developed. In the fire-cured producing areas, the producers have not been able to adjust their farm economy rapidly enough to keep pace with the decreasing demand for the fire-cured product; or, if they shift to the burley type in Kentucky and Tennessee, or the flue-cured type in Virginia, they may add to an oversupply of these types. In the cigar leaf producing areas, many growers have shifted from tobacco to other crops, like potatoes, and there have had to meet the distressed conditions recurring in the potato industry.

Was for Human Consumption

Up to the present time, the exploitation of tobacco has been confined almost entirely to the manufacture of cigars, cigarettes, snuff, smoking, and chewing tobaccos, with the waste products going to by-products for processing into dusts, nicotine and fertilizer material. In recent years, some attention has been directed to the recovery of other substances which will enhance the value of the present raw wastes or more especially to widen the use for leaf tobacco for industrial uses outside of those channels for human consumption. These new products include alkaloids other than nicotine which are known to occur in tobacco; the organic acids like malic, citric and oxalic which are used extensively in the arts, essential oils, chlorophyll, xanthophyll, and pectin which might be recovered and which add to the value of the raw tobacco material.

Tobacco extract carrying little or no nicotine has been manufactured as a tobacco by-product and has been an export commodity. It has recently been found to have value as a spreader for insecticides. Tobacco cellulose has been used in a limited way for use in paper manufacturing, and it has been indicated to possess certain characteristics for specialized uses such as cigarette paper.

One hundred thirty to 140 million pounds of factory wastes are converted to produce about 700,000 to 800,000 pounds of nicotine alkaloid. It is interesting to note that this tonnage of raw material is equivalent to about sixteen per cent of the domestic consumption of tobacco.

Regular Extraction Seen Possible

Nicotine has long been recognized as an ideal insecticide for use as a contact poison for certain groups of insects. These insects appear, however, in variable numbers from year to year. This has resulted in a variable year to year demand, and it has frequently developed excessive inventories. A more regular demand has been sought in order to better handle inventories, and adjust diversion stocks. Such outlet has been found in the use of nicotine as a stomach poison, as in the control of the codling moth in tree fruits. With the establishment of more regular and larger demands for nicotine, it will be possible for the extractors to absorb increasing

By P. A. WELLS

Director of Eastern Regional Research Laboratory, United States Department of Agriculture, Philadelphia

When legislative authority for regional research laboratories was passed in Congress, Senator Harry Flood Byrd, of Virginia, sponsored an amendment which provided that tobacco and tobacco by-products should be the first commodities studied in these laboratories. What progress has been made? What tobacco work is being done? Mr. Wells' article responds to these interrogations.

quantities of low grade tobaccos from the leaf markets, as long as the demand for nicotine for contact insecticide purposes continues.

Nicotine, in the form of pure alkaloid, is sold in various concentrations usually ranging from forty to ninety-nine per cent concentration, and in the form of sulphate of forty per cent nicotine content. Nearly all of it is sold for insecticide purposes, although recently small lots have gone into pharmaceuticals. For example, about 50,000 pounds of nicotine are now made into nicotinic acid, the vitamin required in the cure of pellagra.

As indicated above, the nicotine manufactured in the United States is secured from the factory wastes, and the remainder is derived from low grade leaf and farm scraps. The rapid and continued expansion of the cigarette industry, in recent years, has supplied sufficient nicotine to meet the increased demands for its use as a contact insecticide. However, in certain branches of horticulture the codling moth is becoming a more serious pest, and more frequent applications of poison are required to keep this pest under control. This has resulted in a demand for a poison that will control this insect, and yet will not render fruit products unsafe for human consumption.

Nicotine has been found to be such a material. Research work done by the Bureau of Entomology and Plant Quarantine, various State experiment stations, and the tobacco by-products industry itself has shown the value of nicotine for the control of the codling moth. The use of nicotine in the control of this pest is rapidly increasing.

Rise of Nicotine Bentonite

Researches leading up to the present development were begun in 1928. In 1936 the commercial applications of nicotine especially that of the so-called "fixed" nicotine like nicotine bentonite, totalled approximately 400 pounds of the alkaloid. In 1937 it was estimated 4,000 pounds of the alkaloid were used for codling moth, in 1938, 40,000 pounds, and in 1939, 80,000 to 100,000 pounds. Reports from entomologists and the industry indicate that in 1940 nearly 150,000 pounds of the pure alkaloid were used for codling moth control in the various apple growing regions of the United States. In recent years, no other tobacco product has shown a similar expansion in use. It is believed that there will be consumed within ten years, in the apple industry, nearly one million pounds of nicotine alkaloid per annum.

Of equal importance in horticulture is vaporized nicotine, which is finding increasing utilization in truck crops, and promises to be of value in certain tree crops, particularly citrus. The present research work in this field was begun about 1933, and since then has been actively prosecuted by the research staffs of the industry, the Bureau of Entomology and

Plant Quarantine, and various state experiment stations. The purpose of this work has been to develop a method of applying nicotine as a vapor for use as a contact insecticide to replace the nicotine lime dusts and the liquid spray. The application has found ready acceptance in certain areas and on certain crops. When perfected, it should considerably increase the use of the alkaloid in this field because of cheapening the cost of control, its greater ease of application, and its greater effectiveness. It is estimated that with the perfection of the application of the vaporized nicotine, the market for nicotine will be increased by 200,000 pounds of the alkaloid during the next ten years.

Use's Growth for Poultry

Another example of expansion in the use of nicotine, in recent years, is found in its application for the control of certain body and internal parasites of poultry. Within the past decade, the consumption of nicotine in the poultry industry has developed from little or nothing to an estimated 150,000 pounds of the pure alkaloid, representing the nicotine contained in 5 to 6 million pounds of leaf tobacco.

While nicotine and its products offer an immediate approach to widening the markets for low grade tobaccos, it is believed that other constituents of the tobacco plant such as tannin, pigments, organic acids, and pectin offer possibilities for commercial application.

In view of the above situation in the tobacco industry, it is obvious that there is urgently needed an extensive program of research to increase the present industrial uses of tobacco and to find new ones. Such research is now being undertaken at the Eastern Regional Research Laboratory at Philadelphia. It is one of the major surplus problems being investigated there.

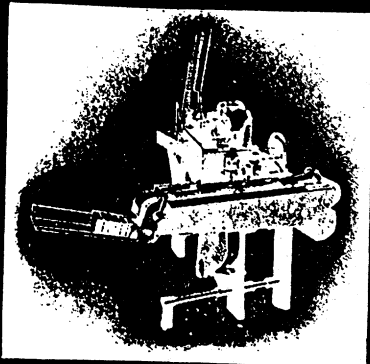
Studies are being made of the value of the various constituents that are isolated from the tobaccos, and methods are being sought to make such constituents or products available to agriculture and industry. Furthermore, products now available from tobacco, such as nicotine, are being studied in order to extend the use of this important tobacco constituent. Studies are planned on activators for nicotine, which will reduce the cost to the farmer of certain types of application, thereby tending to widen the market for nicotine. Further studies are planned in the so-called "fixed" nicotine compounds, so that this type of material can find a wider market in the field now held by the metallic poisons. For example, in the apple growing industry, the use of the fixed nicotine for the control of the codling moth can be very widely extended. The control of a wider group of insects with these fixed nictines, as well as other types of nicotine compounds, remains unexplored to a large degree and studies are planned that will be directed toward that end.

To Cut Production Costs

It is realized that the present relatively high cost of nicotine stands in the way of its more extensive use. Therefore, the production of nicotine from tobacco is being studied with the view to making it more efficient and hence to making it more extensively available, especially in its insecticide field. As a corollary to this, field studies are under way in the growing of rustica tobacco as a nicotine crop, to replace in part the smoking tobacco crop.

Utilization of certain types of tobacco powders as carriers of insecticides, the use of nicotine-free tobacco extract as an adhesive and spreader, and the application of certain tobacco residues, are examples of expanded uses for to-

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bacco that will be studied and offer a broad field of attack.

More example uses to be studied are practical methods of isolation, and the possibilities for commercial exploitation, of the following materials; alkaloids other than nicotine which are known to occur in tobacco; organic acids, essential oils, chlorophyll, xanthophyll, and pectin; as a blood coagulant for possible use in surgery; use of tobacco cellulose in the manu-

facture of cigarette papers; and development of derivatives from nicotine which will have application in industry and the arts such as nicotinic acid has recently achieved.

Tobacco Work Begun in 1940

It is believed that the above program is the common sense, logical approach to some of the problems confronting the tobacco industry.

The first unit of the Eastern Regional Research Laboratory was occupied in August, 1940, and tobacco research was started immediately. The work is being expanded as rapidly as the assembly of equipment and personnel will permit. The tobacco industry is cooperating with the staff enthusiastically, and there is every reason to believe that valuable results will come from this cooperation. Suggestions and criticisms will be welcome as the program develops.

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Pacific Trade Cargo Rates Reduced But War Prospects Continue

American marine insurance underwriters announce further reductions in tobacco war-risk insurance rates covering shipments to and from Australasia and other countries in the Far East. These reductions, it was pointed out, were made because it was recognized that, since December 1, 1940, the hazards of shipping in Pacific waters had been small, and that the greater hazards were in the combat zones.

On shipments to and from Australasia, via the Cape of Good Hope, the rate on shipments by United States-flag vessels has been reduced from \$1.75 on each \$100 of the shipment's value to \$1.50, and on shipments by foreign-flag vessels from \$4.50 to \$4. On exports to Australasia, via Panama, by United States-flag vessels the rate is now fifty cents on each \$100, against seventy-five cents previously, and on other neutral-flag vessels the rate is now \$1, against \$1.50 previously.

Rate on imports, via Panama, remains unchanged at fifty cents by United States-flag vessels and \$1 by other neutral vessels, the same as on exports, and the rate on shipments by belligerent-flag vessels remains unchanged at \$1.50 for both exports and imports.

On shipments between Australasia and the Pacific coast of North, Central and South America, via trans-Pacific, the rate on exports

Manila, Japan, China, India, Dutch East Indies and other Far-Eastern countries the rate on both exports and imports via Cape on shipments by United States-flag vessels has been reduced from \$1.75 to \$1.50. The rate on shipments by other flag vessels remains unchanged at \$4. Rate on imports via Panama has been reduced from 62 1/2 cents on each \$100 to fifty cents.

Exports by United States-flag vessels, via Panama, have been reduced from seventy-five cents to fifty cents, and by other flag vessels imports from \$1.62 1/2 to \$1.50. Rate on exports, via Panama, by other flag vessels has been reduced from \$1.75 to \$1.50. The rate on shipments between the Far East and Pacific ports of North, Central and South America via trans-Pacific on imports by United States-flag vessels was cut from 62 1/2 cents to fifty cents, and on exports from seventy-five cents to fifty cents. On shipments by other flag vessels, both imports and exports, the rate has been reduced from \$1.50 to \$1.37 1/2.—H. T.

Buchanan Was 76

Charles P. Buchanan, at one time head of the old tobacco firm of Buchanan & Lyall, makers of Planet and Neptune plug, who was once a millionaire and filed a petition in bankruptcy in 1913, died last